

THE EFFECTS OF B/L-DEPENDENT HEATING ON THE FORMATION AND EVOLUTION OF A MULTI-THREADED PROMINENCE

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We have developed a comprehensive, multi-threaded, three-dimensional model of the plasma dynamics and energetics of a prominence and its overlying arcade (Luna et al. 2012). In this model, the basic magnetic structure is that of two interacting sheared arcades, while the cool condensations composing the prominence are formed by the well-studied thermal nonequilibrium mechanism. In a given filament-channel flux tube, the mass is evaporated from the chromosphere by heating localized near the footpoints, and condenses in the form of transient blobs or a persistent thread. Our previous studies of thermal nonequilibrium used steady or impulsive heating functions with no dependence on local physical. However, parametric active-region models with steady heating proportional to B/L , where B is the flux-tube magnetic field strength at each footpoint and L is the flux-tube length, yield the best agreement with observations (e.g., Schrijver et al. 2008). We have determined the effects of this active-region heating function on our model for the formation and evolution of prominence mass. We have also expanded the range of our computational domain to include more of the overlying arcade (the so-called “cavity”) than in Luna et al. (2012), and have increased the number of selected flux tubes from 125 to 533. We will illustrate the time-dependent plasma behavior produced by the B/L heating function with synthetic images in several AIA passbands, and compare the resulting prominence properties with those predicted by our model with steady heating.